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| 10/709,227   | 04/22/2004  | Rick Lee Morrison    |                     | 3226             |
| 7590   | 06/20/2007  |                      | EXAMINER            |                  |
| Rick L. Morrison<br>Distant Focus Corporation<br>60 Hazelwood Drive<br>Champaign, IL 61820 |             |                      | RASHID, DAVID       |                  |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

|                              |                 |                    |
|------------------------------|-----------------|--------------------|
| <b>Office Action Summary</b> | Application No. | Applicant(s)       |
|                              | 10/709,227      | MORRISON, RICK LEE |
|                              | Examiner        | Art Unit           |
|                              | David P. Rashid | 2624               |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1)  Responsive to communication(s) filed on \_\_\_\_\_.
- 2a)  This action is FINAL. 2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4)  Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-24 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 22 April 2004 is/are: a)  accepted or b)  objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a)  All b)  Some \* c)  None of:
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_.

## **DETAILED ACTION**

All of the examiner's suggestions presented herein below have been assumed for examination purposes, unless otherwise noted.

### ***Priority***

1. MPEP Section 201.11(B) REFERENCE TO PRIOR PROVISIONAL APPLICATIONS cites the proper way to reference prior provisional applications:

“When the nonprovisional application is entitled to an earlier U.S. effective filing date of one or more provisional applications under 35 U.S.C. 119(e), a statement such as “This application claims the benefit of U.S. Provisional Application No. 60/---, filed ---, and U.S. Provisional Application No. 60/ ---, filed ---.” should appear as the first sentence(s) of the description or in an application data sheet.... Thus, applicants seeking to claim the priority to a provisional application under 35 U.S.C. 119(e) should not state that the application is a “continuation” of a provisional application or that the application claims 35 U.S.C. 120 benefit to a provisional application.”

It is suggested to replace the first sentence of the description or application data sheet with “This application claims the benefit of U.S. Provisional Application No. 60/464,346, filed March 24, 2003.”

***Drawings***

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the examiner has determined that with the high number of objections and corrections needed, they are not acceptable for examination. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

***Specification***

3. The following is a quote from 37 CFR 1.72:

(b) A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract" or "Abstract of the Disclosure." The sheet or sheets presenting the abstract may not include other parts of the application or other material. The abstract in an application filed under 35 U.S.C. 111 may not exceed 150 words in length. The purpose of the abstract is to enable the United States Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure.

4. The abstract is objected to for the following reasons the title of the invention is contained on the abstract sheet – suggest removing the title of the invention from the abstract sheet.

5. The specification is objected to because of the following informalities:

(i) Paragraph [0036], line 14 contains a grammatical error – suggest changing to "...not crucial to this invention..."

(ii) Paragraph [0041], line 2 contains a grammatical error – suggest adding a space between "1221" and "moves"

(iii) Paragraph [0112], line 3 contains a grammatical error – suggest changing to  
“...operate by deflecting...”

Appropriate correction is required.

### ***Claim Objections***

6. The following is a quotation of 37 CFR 1.75(a):

The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

7. **Claims 1 through 29** are objected to under 37 CFR 1.75(a), as failing to conform to particularly point out and distinctly claim the subject matter which application regards as his invention or discovery.

(i) Claim 1, line 1: Though independent claim 1 is identified as a method claim, claim 1 is an apparatus claim, as identified by its dependents (e.g. “The device in claim 1...”) – it is suggested to change claim 1, line 1 to “A device for illuminating a scene...”.

(ii) Claim 8, line 2 is cites “a duration of about a few nanoseconds” without any definite magnitude or range when using the word “about”. It will be assumed for examination purposes “a duration of a few nanoseconds”.

(iii) Claims 1 through 29: The claims are not properly numbered when using custom notation (e.g. “[c1]” for claim 1) and depending from another claim from which the custom notation is not being used (e.g. “The method of claim 1...” for dependent claim 2) – it is suggested to convert the custom notation for each claim to be in consistent format with the claims from which are dependent (i.e. change “[c1]” to “1.” and so forth for all claims).

8. The following is a quotation of 37 CFR 1.75(d)(1):

The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

9. **Claims 11, 15, 17, and 18** are objected to under 37 CFR 1.75(d)(1), as failing to conform to the invention as set forth in the remainder of the specification. The matter disclosed in claim 18 is not fully disclosed in the specification -- it is suggested to add the matter to the specification (without the addition of any new matter outside of what is disclosed in the claims themselves).

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. **Claims 1, 2, 3, 4, 5, 6, 7, 10, 11, 13, 14, 15, 16, 17, 19, 20, 21, 22, and 23** are rejected under 35 U.S.C. 102(b) as being anticipated by Stappaerts et al. (US 6,115,123 A).

Regarding **claim 1**, Stappaerts discloses a method for illuminating a scene and analyzing the reflected radiance comprising:

(a) an illumination device (FIG. 1, elements 10, 12, 22, 24, 26, 28, 30) having a means of generating (FIG. 1, elements 10, 12, 22) and directing (FIG. 1, elements 22, 24, 26, 28, 30) radiance (“laser” in FIG. 1; FIG. 2, element 34) toward a scene (“Outgoing beam”, “Object return” in FIG. 1; FIG. 2, element 36) where said radiance is composed of a selective set of time sequential, spatially encoded intensity patterns (Encoding is transforming information into one format to another. Element 10 is locked to a master oscillator (Col. 3, lines 42 – 46), wherein the intensity pattern is an arbitrary frequency pattern of equally-spaced pulses “encoded” from the desired numerical frequency value to its actual radiant output. The pattern itself is the number of equally sequential and spaced pulses emitted over an arbitrary period of time. The series of pulses emitted from element 10 are “time sequential”. where the radiance has, in addition, a resolvable temporal structure (Element 10 is locked to a master oscillator (Col. 3, lines 42 – 46) giving it a “resolvable temporal structure”).,

(b) a receiving device (FIG. 1, element 18; FIG. 6) having a means (a CCD is an individual or collection of photosensors) of optically collecting the reflected radiance from said scene (FIG. 3; Col. 1, lines 40 – 43) and converting said reflected radiance into an analyzable signal (FIG. 3; Col. 2, lines 39 – 40),

(c) a means of controlling and maintaining (the device responsible to carry out the action in Col. 6, lines 33 – 37) the synchronization between generation of said radiance patterns and said collected signal (Col. 6, lines 33 – 37),

(d) a data processor device (FIG. 1, element 20) having a means to collect (Col. 2, lines 39 – 40) and store multiple sets of said signals (Col. 2, line 65 – Col. 3, line 2 wherein the

processor itself would need memory to receive the “two-dimensional array of electronic signals representing said hologram”), and

(e) said data processor (FIG. 1, element 20) having in addition a program (A program is a set of instructions that describe a task to be carried out by a processor. The processor of Stappaerts would require a program to carry out the action to provide a means to combine various sets of signals in a prescribed manner whereby a representation of the scene is determined.) providing a means to combine various sets of signals in a prescribed manner (Col. 2, line 67 – Col. 3, line 2), whereby a representation of said scene is determined (Col. 2, lines 39 - 40).

Regarding **claim 2**, Stappaerts discloses the device in claim 1 wherein the representation of the scene is a data set that can be used to render a three dimensional model of the scene (“hologram pattern” in Col. 2, lines 39 - 40).

Regarding **claim 3**, Stappaerts discloses the device in claim 1 wherein the representation of the scene (FIG. 2, element 36) is data set separable into range estimations (“fence” range method in Col. 7, lines 55 – 67; “return path” in Col. 2 lines 61 - 68) and intensity values (refer to references/arguments in claim 4) of elements in the scene.

Regarding **claim 4**, Stappaerts discloses the device in claim 1 wherein the representation of the scene (FIG. 2, element 36) is an array of intensity values (“Object Beam” and “LO Beam 1-10nj” in FIG. 6 to element 48) that can be interpreted as an image (CCD element 48 in FIG. 6 “can” be interpreted as an image, more specifically – a hologram when sent to the “hologram processor” in FIG. 6).

Regarding **claim 5**, Stappaerts discloses the device in claim 1 wherein the representation of the scene (FIG. 2, element 36) is a data set (“Target Return” in FIG. 6) conforming to a prescribed manner of rendering an image (“To Hologram Processor”, “Object Beam”, and “LO Beam 1-10nj” in FIG. 6; ).

Regarding **claim 6**, Stappaerts discloses the device in claim 1 wherein the radiance source (FIG. 1, elements 10, 12, 24, 26, 28, 30) is a laser (refer to references/arguments cited in claim 1).

Regarding **claim 7**, Stappaerts discloses the device in claim 1 wherein the radiance source (FIG. 1, elements 10, 12, 24, 26, 28, 30) is composed of multiple monochromatic sources (FIG. 1, elements 10, 12 wherein lasers are monochromatic) and the scene representation (FIG. 2, element 36) includes additional spectral information (“infrared” in Col. 7, lines 55 - 56).

Regarding **claim 10**, Stappaerts discloses the device in claim 1 wherein the illumination device (FIG. 1, elements 10, 12, 24, 26, 28, 30) generating the encoded patterns (refer to references/arguments cited in claim 1) selects from a set of predetermined patterns (Element 10 is locked to a master oscillator (Col. 3, lines 42 – 46), wherein the intensity pattern is an arbitrary frequency pattern of equally-spaced pulses “encoded” from the desired numerical frequency value to its actual radiant output. The pattern itself is the number of equally sequential and spaced pulses emitted over an arbitrary period of time. Any frequency that element 10 locks unto from the master oscillator produces a predetermined pattern (e.g., 5 GHz will produce a pulse every nanosecond to produce a pattern of equally spaced pulses over an arbitrary period of time.).).

Regarding **claim 11**, Stappaerts discloses the device in claim 1 wherein the set of patterns are adaptively determined concurrent with analysis (FIG. 6; Col. 7, lines 20 - 36).

Regarding **claim 13**, Stappaerts discloses the device in claim 1 wherein the generating patterns that create the encoded intensity patterns (FIG. 1, elements 10, 12, 22) are microscopic spatial light modulating elements (FIG. 1, element 22) that produce calculable diffractive optical effects (Col. 5, lines 36 – 38; Col. 3, lines 18 - 26).

Regarding **claim 14**, Stappaerts discloses the device in claim 1 wherein the generating patterns (refer to references/arguments cited in claim 1) that create the encoded intensity patterns (refer to references/arguments cited in claim 1) are holographically recorded patterns (“To Hologram Processor” in FIG. 6).

Regarding **claim 15**, Stappaerts discloses the device in claim 1 wherein the generating patterns (refer to references/arguments cited in claim 1) that create the encoded intensity patterns (refer to references/arguments cited in claim 1) are inscribed on a surface (FIG. 4) and pivoted into position (Col. 3, lines 35 - 38).

Regarding **claim 16**, Stappaerts discloses the device in claim 1 wherein the generating patterns (refer to references/arguments cited in claim 1) that create the encoded intensity patterns (refer to references/arguments cited in claim 1) are inscribed on a surface (FIG. 4) and translated into position (“without offset” in FIG. 4B and “with elevation offset” in FIG. 4C).

Regarding **claim 17**, Stappaerts discloses the device in claim 1 wherein a reconfigurable micro-structured device (FIG. 1, element 22; Col. 5, lines 36 – 38) presents the generating patterns that create the encoded intensity patterns.

Regarding **claim 19**, Stappaerts discloses the device in claim 1 wherein the receiver (FIG. 1, element 18; FIG. 6) is an electro-optic device that converts radiant intensity in to an electronic signal (a CCD performs this function).

Regarding **claim 20**, Stappaerts discloses the receiving device (FIG. 1, element 18; FIG. 6) in claim 1 wherein the device has a means of conditioning the signal for improved analysis (FIG. 6, elements 44, 46, 50, 52).

Regarding **claim 21**, Stappaerts discloses the device in claim 1 wherein the illumination device (FIG. 1, elements 10, 12, 24, 26, 28, 30) and the receiver device (FIG. 1, element 18; FIG. 6) and the data processing device (FIG. 1, element 20) are distinct and separated units (FIG. 1).

Regarding **claim 22**, Stappaerts discloses the device in claim 1 wherein the illumination module (FIG. 1, elements 10, 12, 24, 26, 28, 30) and the receiver device (FIG. 1, element 18; FIG. 6) and the data processing device (FIG. 1, element 20) are combined together into a unified package (FIG. 1).

Regarding **claim 23**, Stappaerts discloses the device in claim 1 wherein the signals are analyzed at multiple discrete time intervals (“laser repetition rate” in Col. 7, lines 55 –67) in order to extract range estimates (“approximate target direction” and “location of the fence” that is dependent on the delay time in Col. 7, lines 55 – 67).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination between Stappaerts et al. (US 6,115,123 A) and Anderson (US 4,817,434 A).

Regarding **claim 8**, while Stappaerts discloses the device in claim 1, Stappaerts does not teach that the radiance is emitted as a pulse with a duration of about a few nanoseconds.

Anderson discloses a device for imaging three dimensions using simultaneous multiple beam formation (FIG. 1) that teaches that the radiance is emitted as a pulse with a duration of about a few nanoseconds (Col. 11, line 65 – Col. 12, line 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the device of Stappaerts to include the radiance to emit as a pulse with a duration of about a few nanoseconds as taught by Anderson "...which will propagate....without significant interference effects.", Col. 11, line 68 – Col. 12, line 1.

14. **Claim 9 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination between Stappaerts et al. (US 6,115,123 A) and Brienza et al. (US 3,549,256 A).

Regarding **claim 9**, while Stappaerts discloses the device in claim 1 wherein the radiance is a series of pulses (refer to references/arguments cited in claim 1), Stappaerts does not teach wherein the pulse repetition rate changes monotonically during the interval of one pattern.

Brienza discloses a laser pulse compression ranging system using double-chirped pulses (FIG. 2) wherein the pulse repetition rate changes monotonically (Frequency vs. Time charts in

FIG. 3) during the interval of one pattern (The pattern is the shape of the frequency over the period of time from which the frequency completes its shift in FIG. 3.).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the device of Stappaerts to include the pulse repetition rate to change monotonically during the interval of one pattern as taught by Brienza "...to provide an improved optical ranging system by using pulse compression techniques.", Col. 1, lines 60 – 62.

Regarding **claim 24**, while Stappaerts discloses the device in claim 1 wherein the signals (refer to references/arguments cited in claim 1) are mixed with a pulse train in order to generate an interference signal (Col. 2, lines 32 - 38) that indicates a range estimate (Col. 7, lines 55 - 67), Stappaerts does not teach wherein the pulse train is monotonically increasing.

Brienza discloses a laser pulse compression ranging system using double-chirped pulses (FIG. 2) wherein a pulse train is monotonically increasing (Frequency vs. Time charts in FIG. 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the device of Stappaerts to include a monotonically increasing pulse train as taught by Brienza "...to provide an improved optical ranging system by using pulse compression techniques.", Col. 1, lines 60 – 62.

15. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination between Stappaerts et al. (US 6,115,123 A) and Morrison (US 5,113,286 A).

Regarding **claim 12**, while Stappaerts discloses the device in claim 1, Stappaerts does not teach wherein the generating patterns that create the encoded intensity patterns are microscopic

surface relief elements which impart a spatially variant phase delay to the light beam to produce calculable diffractive optical effects.

Morrison discloses a diffraction grating apparatus of forming a surface relief pattern (FIG. 4; FIG. 16) wherein the generating patterns that create the encoded intensity patterns (FIGS. 8 - 11) are microscopic surface relief elements (FIG. 4, element 42; FIGS. 12 - 15) which impart a spatially variant phase delay (Col. 14, lines 13 - 16) to the light beam (“Laser Diode” in FIG. 16) to produce calculable diffractive optical effects (Col. 13, lines 21 –24; Col. 14, lines 13 - 16).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the light beam generating patterns that create the encoded intensity patterns of Stappaerts to include microscopic surface relief elements which impart a spatially variant phase delay to the light beam to produce calculable diffractive optical effects as taught by Morrison to solve the problem (“This problem is solved...” in Col. 2, lines 45 – 54) as “[i]n order for digital optical systems to move from the realm of theory to practical prototype, a number of issued related to spot array generation must be addressed.”, Col. 1, lines 33 – 34.

16. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination between Stappaerts et al. (US 6,115,123 A) and Tumminelli et al. (US 5,166,940 A).

Regarding **claim 18**, while Stappaerts discloses the device in claim 1 wherein the radiance is directed toward the scene using an appropriate combination of lenses, reflectors, and optical elements, Stappaerts does not teach wherein the radiance is directed toward the scene using fiber optics.

Burney discloses a fiber laser (FIG. 1, element 10) that teaches using fiber optics (FIG. 1, element 18) in directing radiance (radiance from FIG. 1, element 12 is being directed through element 18) toward a scene (“Output” in FIG. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the laser of Stappaerts to be a fiber laser as taught by Tumminelli “...to provide an improved fiber laser which performs as a single-frequency laser with a narrow bandwidth.”, Tumminelli, Col. 1, lines 29 – 31.

### ***Conclusion***

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David P. Rashid whose telephone number is (571) 270-1578. The examiner can normally be reached Monday - Friday 8:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Brian Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



David P Rashid  
Examiner  
Art Unit 2624



*Brian P. Werner*  
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